Geophysical Research Abstracts
Vol. 14, EGU2012-12269, 2012
EGU General Assembly 2012

MINERALOGICAL MAPPING OF QUADRANGLE Av-12 (SEXTILIA) ON 4 VESTA

K. Stephan (1), R. Jaumann (1,2), F. Tosi (3), T. Titus (4), C.M. De Sanctis (3), K. Krohn (1), K.-D. Matz (1), T. Roatsch (1), F. Preusker (1), L. Le Corre (5), V. Reddy (5), C.T. Russell (6), and C.A. Raymond (7)

(1) DLR, Institute of Planetary Research, Berlin, Germany (Katrin.Stephan@dlr.de), (2) FU Berlin, Germany, (3) INAF, Rome, Italy, (4) USGS, Flagstaff, AZ, USA, (5) MPS, Katlenburg-Lindau, Germany, (6) UCLA, Los Angeles, CA, USA, (7) JPL, Caltec, Pasadena, CA, USA

Since the arrival of the Dawn spacecraft at Vesta the Visible and InfraRed Imaging Spectrometer (VIR) has acquired hyperspectral images of Vesta's surface in the wavelength range from 0.25 to 5.1μm. As part of the analysis of Vesta's surface composition a series of 15 quadrangle maps have been produced showing the results derived from the spectroscopic analysis of the VIR data. We present the results of the spectroscopic analysis achieved for the quadrangle Av-12 (Sextilia), which covers Vesta's surface between 21°S - 66° S and 90° - 180° E. The region is dominated by the impact crater Sextila (∼39°S/146°E) with its very well preserved continuous ejecta blanket, as well as two huge tectonic scarps (Argonium and Matronalia Rupes), which define the margin of Vesta's southern impact basin Rheasilvia (Krohn et al., 2012, this session).
VIR spectra show clear evidence of Vesta's basaltic surface composition. However, significant variability in slope, strength and wavelength position of the prominent pyroxene absorptions near 0.9 and 1.9μm indicate multiple physical surface processes (De Sanctis et al., this session). Based on the combination of the visible albedo, spectral parameters like the depths of the pyroxene absorptions as well as color ratio composites using the VIR channels centering at 749nm/438nm (Red), 749nm/917nm (Green) and 438/749nm (Blue) Vesta's surface can be divided into different terrain types, which are mostly related to specific geological units or morphological surface features (De Sanctis et al., this session). Among these terrain types the quadrangle Av-12 can be divided very broadly into: 1) The Southern Terrain (ST), which dominates the southern part of the quadrangle V-12 and extends into the Rheasilvia impact basin, exhibits very deep pyroxene absorptions. 2) The pyroxene signature in the Mid-Latitude Terrains (MLT) located mainly between 20 and 50°S is slightly subdued in comparison to the ST but still distinct. On a local scale, fresh bright material associated to a strong pyroxene signature appears in the vicinity of several small impact craters and their ejecta, whereas others partly show low albedo ("dark") ejecta with a strongly subdued pyroxene signature. Several large impact craters like the prominent impact crater Sextilia (∼20km in diameter), from which the quadrangle itself is named, shows bright material on the crater rim, probably representing fresh material excavated due to mass wasting processes. Other peculiar impact craters like Helena (∼41°S/122°E) partially resemble impact craters like Sextilia but also show portions of the crater buried by low albedo material with a subdued pyroxene signature. Only one of the two prominent scarps (i.e. Matronalia Rupes) shows a pronounced spectral signature of fresh material with very deep pyroxene absorptions characteristic for the ST terrain.

The authors gratefully acknowledge the support of the Dawn Instrument, Operations, and Science Teams. This work is supported by NASA through the Dawn project and the German Space Agency (DLR).